## REMARKS

Claims 1-7, 9-18, 20-29, and 31-33 were pending at the time of the Office Action, with claims 8, 19, and 30 having previously been canceled.

The previous Office Action of June 27, 2006, indicated that claims 8, 19, and 30 each recited subject matter that would be allowable if rewritten in independent form to include the limitations of the claims from which each depended. Applicants amended independent claims 1, 11, and 21, to recite the allowable subject matter. Applicants believed the amendments put the claims in condition for allowance. However, in the present Office Action, new rejections are raised to the form of the claims and to the patentability of what each recites in the face of newly cited art.

Claims 1, 4, 5, 10-12, 14-18, 20, 21, 23, 25, 30 and 32 are currently amended.

Claims 3 and 13 are presently canceled.

Claims 34 and 35 are presently added.

Thus, claims 1-2, 4-7, 9-12, 14-18, 20-29, and 31-35 are currently pending.

### Summary of Interview

Applicants and their representative are grateful to the Examiner for conducting an interview to discuss the Office Action, the cited references, and the applicants' proposed response. The telephonic interview was conducted on Thursday, May 31, 2007, with the Examiner, Jared Ian Rutz, and applicants' representative, Frank Bozzo, participating.

The summary reproduced verbatim on the next page was prepared by the Examiner and mailed on June 7, 2007:

"Applicant initiated interview to discuss proposed amendments.

With respect to the rejection of claims 11-18, 20, and 32 under 35 USC 112 first paragraph and 35 USC 101, Applicant proposed amendments to more clearly show that claim 11 is directed to a computer storage media storing computer readable instructions. The Examiner indicated that the proposed amendment would be sufficient to overcome the rejection of claims 11-18, 20, and 32 under 35 USC 112 first paragraph and 35 USC 101 presented in the Office action of 3/21/2007.

With respect to the rejection of claims 11-18, 20, and 32 under 35 USC 102(b) as being anticipated by Voight, Applicant proposed amendments to positively recite that the claimed computer storage media stores the recited computer readable instructions. The Examiner indicated that the proposed amendments would be sufficient to overcome the rejection of claims 11-18, 20, and 32 under 35 USC 102 as being anticipated by Voight presented in the office action of 3/21/2007.

With respect to the rejection of claims 1-7, 9, 11-18, and 31-32 under 35 USC 102(a) as being anticipated by Robertson, Applicant proposed amendments to more clearly define differences between the claimed invention and the prior art of record. The Examiner suggested alternative wording to more clearly define the desired limitations. However, the Examiner indicated that more search in consideration would be required to determine patentability of the claims.

With respect to the rejection of claims 10, 20, 21-29, and 33 under 35 USC 103(a) as being unpatentable over Robertson in view of Gupta, Applicant proposed amendments to more clearly define differences between the claimed invention in the prior art of record. The Examiner indicated that it was unclear if the specification as originally filed would support the claims. For the proposed amendments were discussed, in the Examiner indicated that further search in consideration would be required to determine patentability of the claims."

Applicants and their representative are grateful to the Examiner for his time, and appreciate his consideration of the proposed amendment and supporting remarks.

## Comment regarding Amendment to the Specification

The amendment to the specification is made to clarify support in the application for new claims 34 and 35. The amendment to the specification includes a recitation included in originally-presented claims 10, 20, and 30. For example, original claim 10 recited the following limitation:

> 10. The method of Claim 1, further comprising storing a timestamp within the allocable memory block, wherein the timestamp indicates the time when one of requesting and freeing the allocable memory block is performed.

The recitation of this originally presented claim, "the timestamp indicates the time when one of requesting and freeing the allocable memory block" is included in the specification by the foregoing amendment, as authorized by MPEP Section 2163.03, Part III. Applicants submit that, having been included in the originally presented application, that this statement discloses no new matter. Moreover, applicants submit that including this recitation in the specification supports amended claims 10, 20, and 21 and new claims 34 and 35.

## Amendments in Response to Rejections under 35 U.S.C. § 112

Claims 11-18, 20, and 32 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Office Action notes that the claims are directed to a "computer-readable medium arranged for storing computer executable components." The Office Action states that this is "subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the related art that the inventor(s), as the time the application was filed, has possession of the claimed invention." (Office Action, Page 2, Paragraph Number 3). Specifically, the Office Action states that there is

not "a portion of the specification that teaches which type of computer readable media are

'arranged for storing [computer executable components as recited in claim 11]." (Office Action,

Pages 2-3, Paragraph Number 3; respectfully, applicants have substituted in this quote the

bracketed language to represent what claim 11 recites, which applicants respectfully believe the

Office Action intended to quote). Applicants respectfully disagree with the rejection, but

nonetheless have amended claims 11-18, 20, and 32 in such a way as to resolve the rejection.

Applicants have amended independent claim 11 to recite a computer readable-storage

medium, which applicants submit is supported by the specification. Claim 11 as amended is

reproduced below for the convenience of the Examiner:

> 11. (Currently Amended) A computer storage ~~computer-readable~~ medium ~~arranged for~~ storing computer readable instructions ~~computer-executable components~~ for overwrite detection within an allocable memory block, comprising:
>
> a first component that is arranged to receive a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block;
>
> a second component that is arranged to generate an overwrite detection pattern for the allocable memory block wherein the overwrite detection pattern is written at an end of the allocable memory block opposite another end of the allocable memory block in which a header for the allocable memory block is stored;
>
> a third component that is arranged to store the overwrite detection pattern in the allocable memory block;
>
> a fourth component that is arranged to generate a checksum on the allocable memory block;
>
> a fifth component that is arranged to store results of the checksum in the header of the allocable memory block; and
>
> a sixth ~~fourth~~ component that is arranged to store a heap index for the allocable memory block within the allocable memory block, wherein the heap index points to one of a plurality of heaps.

Applicants submit that a "computer storage medium storing computer readable instructions" is

subject matter that is understandable to one ordinarily skilled in the related art. In addition,

applicants assert that the specification expressly describes what is recited in claim 11 such that

the computer storage medium recited in these claims is "described in the specification in such a

way as to reasonably convey to one skilled in the related art":

> Computing device 100 may have additional features or functionality. For example, ***computing device 100 may also include additional data storage devices*** (removable and/or non-removable) such as, for example, magnetic disks, optical disks, or tape. Such additional storage is illustrated in FIGURE 1 by removable storage 109 and non-removable storage 110. ***Computer storage media may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information, such as computer readable instructions***, data structures, program modules, or other data.

(Specification, Page 4, Lines 10-17; emphasis added). Claim 11 as amended is supported by the

specification. Accordingly, applicants submit that the rejection under 35 U.S.C. § 112, first

paragraph, should be withdrawn against claim 11.

Claims 12-18, 20, and 32, depend from and apply additional limitations to claim 11.

Accordingly, claims 12-18, 20, and 32, incorporate the limitations of claim 11 and, thus, the

rejection under 35 U.S.C. § 112, first paragraph, also should be withdrawn against these claims.

In addition, applicants have amended claims 12-18, 20, and 32 so that each recites a "computer

storage medium," which is supported by the specification. Applicants thus submit that rejection

under 35 U.S.C. § 112, first paragraph, should be withdrawn against claims 11-18, 20, and 32.

## Amendments in Response to Rejections under 35 U.S.C. § 101

Claims 11-18, 20, and 32 also were rejected under 35 U.S.C. § 101 as being directed to

nonstatutory subject matter. The Office Action notes that the rejection may be overcome by

amending the claims to recite a "computer storage medium." As previously explained,

applicants have amended each of claims 11-18, 20, and 32 to recite a "computer storage

medium." Accordingly, applicants submit that the rejection under 35 U.S.C. § 101 should be withdrawn against claims 11-18, 20, and 32.

## Amendments in Response to Rejections under 35 U.S.C. § 102

There were two groups of rejections under 35 U.S.C. § 102 in the Office Action. First, claims 11-18, 20, and 32 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,092,168 to Voigt (Voigt). The Office Action notes that "Voigt discloses [a] computer-readable medium arranged for storing computer executable components." (Office Action, Page 4, Paragraph Number 8). By contrast, the Office Action notes that claims 11-18, 20, and 32, "do not positively recite that the claimed computer-readable medium stores the recited components." (Office Action, Page 4, Paragraph Number 9; emphasis original).

As previously explained, applicants have amended claim 11 (and thus claims 12-18, 20, and 32, which depend from claim 11) to recite "a computer storage medium storing computer readable instructions." Applicants submit that claims 11-18, 20, and 32 as amended positively recite that the claimed computer storage medium stores the recited components. Thus, applicants respectfully submit that the rejection under 35 U.S.C. § 102(b) under Voigt should be withdrawn.

Second, claims 1-7, 9, 11-18, and 31-32 were rejected under 35 U.S.C. § 102(a) as being anticipated by Robertson et al., "Run-time Detection of Heap-based Overflows," Proceedings of the 17th Large Installation Systems Administration Conference, October 31, 2003, Pages 51-59 (Robertson). Applicants respectfully traverse the rejections.

Claim 1 is currently amended to further clarify its distinctions over Robertson. Claim 1 is reproduced below for the convenience of the Examiner:

1.　(Currently Amended)　A method for providing overwrite detection for an allocable memory block, comprising:

receiving a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block;

performing a checksum on the allocable memory block;

storing results of the checksum within the allocable memory block;

generating an overwrite detection pattern for the allocable memory block;

storing the overwrite detection pattern in the allocable memory block, wherein the overwrite detection pattern is stored separately from the results of the checksum in the allocable memory block;

checking the overwrite detection pattern; and

forcing an access violation if one of the checksum is not valid and the overwrite detection pattern has been modified.

Robertson fails to teach "performing a checksum on the allocable memory block and storing the results of the checksum within the allocable memory block," as well as "generating an overwrite detection pattern for the allocable memory block" and "storing the overwrite detection pattern in the allocable memory block wherein the overwrite detection pattern is stored separately from the results of the checksum in the allocable memory block."

The Office Action equates generating an overwrite detection pattern for the allocable memory block with Robertson's "canary," which "is a checksum covering the memory location of the chunk and the chunks size field seeded with a global value_heap_magic." (Office Action, Page 5, Paragraph Number 11.b.). However, as recited in claim 1, "performing a checksum" on one hand, and "generating an overwrite detection pattern" and "storing the overwrite detection pattern" on the other hand are different limitations. Even if Robertson teaches or suggests the use of a checksum, Robertson does not separately teach or suggest the generating or storing of an overwrite detection pattern. Robertson fails to teach or suggest all of the elements recited by claim 1, and thus cannot anticipate claim 1.

Claims 2 and 4-9 depend from and apply additional limitations to claim 1, and thus are

patentable for at least the same reasons for which claim 1 is patentable. Claim 3 is canceled,

thereby mooting the rejection to claim 3. Thus, the rejection under 35 U.S.C. § 102(a) based on

Robertson against claims 1-2 and 4-9 must be withdrawn.

Claim 11 is currently amended to further clarify its distinctions over Robertson. Claim

11 is reproduced below for the convenience of the Examiner:

> 11. (Currently Amended) A <u>computer storage</u> computer-
> readable-medium arranged for-storing <u>computer readable instructions</u> computer-
> executable-components-for overwrite detection within an allocable memory block,
> comprising:
> a first component that is arranged to receive a request for performing one
> of requesting the allocable memory block, requesting the size of the allocable
> memory block, and freeing the allocable memory block;
> a second component that is arranged to generate an overwrite detection
> pattern for the allocable memory block, <u>wherein the overwrite detection pattern is</u>
> <u>written at an end of the allocable memory block opposite another end of the</u>
> <u>allocable memory block in which a header for the allocable memory block is</u>
> <u>stored</u>;
> a third component that is arranged to store the overwrite detection pattern
> in the allocable memory block;
> <u>a fourth component that is arranged to generate a checksum on the</u>
> <u>allocable memory block;</u>
> <u>a fifth component that is arranged to store results of the checksum in the</u>
> <u>header of the allocable memory block;</u> and
> a <u>sixth</u> fourth-component that is arranged to store a heap index for the
> allocable memory block within the allocable memory block, wherein the heap
> index points to one of a plurality of heaps.

Robertson fails to teach "a second component that is arranged to generate an overwrite detection

pattern for the allocable memory block, wherein the overwrite detection pattern is written at an

end of the allocable memory block opposite another end of the allocable memory block in which

a header for the allocable memory block is stored." In addition, Robertson fails to disclose these

limitations in addition to reciting components to "generate a checksum on the allocable memory block" or "to store results of the checksum in the header of the allocable memory block."

Robertson fails to anticipate claim 11 because Robertson teaches including a checksum in the *header* of an allocable memory block, not the inclusion of an overwrite detection pattern written "at an end of the allocable memory block opposite of that in which a header is stored" as recited by claim 11. On page 54 of Robertson in Figure 3 and in the descriptive text that follows, Robertson describes *a checksum that is included in the header at the beginning of a memory chunk*. Respectfully, this is clearly not the same as an overwrite detection pattern recited by claim 11, and it is stored at an end opposite another end of the memory block in which the header is stored, where the checksum is stored. Robertson fails to teach or suggest this limitation of claim 11, and thus fails to anticipate claim 11.

Claims 12, 14-18, 20 and 32 depend from and apply additional limitations to claim 11, and thus are patentable for at least the same reasons for which claim 11 is patentable. Claim 13 is presently canceled, thereby mooting the rejection to claim 13. Thus, the rejection under 35 U.S.C. § 102(a) based on Robertson against claims 11-12, 14-18, 20 and 32 must be withdrawn.

For the foregoing reasons, the rejections under 35 U.S.C. § 102(a) predicated on Robertson against claims 1-2, 4-9, 11-12, 14-18, 20, and 32 must be withdrawn. Respectfully, applicants assert that claims 1-2, 4-9, 11-12, 14-18, 20, and 32 are in condition for allowance.

## Response to Rejections under 35 U.S.C. § 103

Claims 10, 20, 21-29, and 33 were rejected under 35 U.S.C. § 103(a) as being

unpatentable over Robertson in view of Gupta, "Tasks and Task Management,"

(http://www1.ics.uci.edu/~rgupta/ics212/w2002/tasks.pdf) (Gupta). Applicants respectfully

traverse the rejections.

Claims 10 and 20 depend from and apply additional limitations to claims 1 and 11,

respectively, and thus are patentable for at least the same reasons for which claims 1 and 11 are

patentable.

Applicants have amended claim 21 to further clarify its distinctions over the art cited.

Claim 21 is reproduced below for the convenience of the Examiner:

> 21. (Currently Amended) A system for overwrite detection in an allocable memory block, comprising:
>
> a computer memory that comprises a heap in which an allocable memory block can be allocated and freed;
>
> a memory allocator that is arranged to receive a request for performing one of requesting the allocable memory block, requesting the size of the allocable memory block, and freeing the allocable memory block;
>
> a pattern generator that is arranged to generate an overwrite detection pattern for the allocable memory block;
>
> an allocable memory block formatter that is arranged to store the overwrite detection pattern in the allocable memory block; and
>
> a memory timestamp system that is arranged to store a timestamp within the allocable memory block, wherein the timestamp indicates the time ~~when one of requesting and freeing the allocable memory block is performed~~ of:
>
> > the requesting of the allocable memory block once the allocable memory block has been allocated; and
> >
> > the freeing of the allocable memory block once the memory block has been freed.

Respectfully, the cited references fail to teach that "the timestamp indicates the time of: the requesting of the allocable memory block once the allocable memory block has been allocated; and the freeing of the allocable memory block once the memory block has been freed."

The combination of Robertson and Gupta fails to present a *prima facie* case of obviousness because the references fail to recite all of the limitations recited in the claims as required by the Manual of Patent Examining Procedure. *See* MPEP § 706.02(j) ("the prior art reference (or references when combined) must teach or suggest all the claim limitations"). Gupta describes the user of a time stamp to indicate with each block *allocated*. (Gupta, Slide 33). Gupta expressly states that this time stamping "makes it possible to see how long a memory block has been allocated." (Gupta, Slide 33). However, this does not disclose all of what is recited in claim 21 which recites "the timestamp indicates the time of: the requesting of the allocable memory block once the allocable memory block has been allocated; and the freeing of the allocable memory block once the memory block has been freed." Because Gupta does not describe that the time stamp indicates the time of the freeing of the allocable memory block, Gupta does not overcome the shortcomings of Robertson. In addition, the recited limitations are supported by the specification, as amended, describing that "the timestamp indicates the time when one of requesting and freeing the allocable memory block." Accordingly, the cited references fail to make out a *prima facie* case of obviousness, and the rejection under 35 U.S.C. § 103(a) must be withdrawn against claim 21.

Similarly, because the cited references fail to describe a timestamp indicating when a memory block is freed, they fail to render obvious new claims 34 and 35:

34.    (New)        The method of Claim 1, further comprising storing a timestamp within the allocable memory block, wherein the timestamp indicates the time when freeing the allocable memory block is performed.

35.    (New)        The computer storage medium of Claim 11, further comprising a timestamp component that is arranged to store a timestamp within the allocable memory block, wherein the timestamp indicates the time when freeing the allocable memory block is performed.

Claims 34 and 35 apply additional limitations to independent claims 1 and 11, respectively, from which each depends. In addition, by adding the limitation of a timestamp that "indicates the time when freeing the allocable memory block is performed," these claims recite limitations neither taught nor suggested by the cited references. Thus, applicants submit that claims 34 and 35 are allowable over the cited references.

Finally, claims 22-29 and 33 depend from and apply additional limitations to claim 21, and thus are patentable for at least the same reasons for which claim 21 is patentable. Thus, the rejection under 35 U.S.C. § 103(a) against claims 22-29 and 33 also must be withdrawn.

Applicants respectfully submit that claims 10, 20, 21-29, and 33 are in condition for allowance.

## CONCLUSION

In view of the foregoing amendments and remarks, all pending claims are believed to be allowable and the application is in condition for allowance. Therefore, a Notice of Allowance is respectfully requested. Should the Examiner have any further issues regarding this application, the undersigned attorney for the applicant humbly requests that the Examiner telephone him at the telephone number provided below.

Respectfully submitted,

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